CLAIMS

1. A method of controlling the inner pressure of a tyre (3) mounted on a rim (2), said method comprising the steps of:
- inflating an inner volume (3') of the tyre (3) to an operating pressure at a reference temperature (TR);
- admitting a fluid compressed to a first pressure higher that the operating pressure of the tyre (3) at the reference temperature (TR), into a tank (4) associated with the rim (2);
- bringing the inner volume (3') of said tyre (3) into communication with said tank (4) when the pressure of the inner volume (3') of said tyre (3) is lower than said operating pressure, by means of at least one mechanical valve (5) opening of which is controlled by an elastic element having an elastic constant (K) varying within a temperature range from -50°C to +50°C in such a manner that said valve is maintained to a closed position following a reduction in the inner tyre pressure due to a temperature reduction within said range;
- stopping the communication between said inner volume (3') and tank (4) when said tyre (3) pressure is substantially equal to said operating pressure.

2. A method as claimed in claim 1, wherein said temperature range is included between about -30°C and about +50°C.

3. A method as claimed in claim 1, wherein said temperature range is included between about -30°C and about +20°C.

4. A method as claimed in claim 1, wherein said elastic

element controlling opening of said valve has a value of elastic constant measured at -50°C ($K^{-50°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by at least 10% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

5. A method as claimed in claim 1, wherein said elastic element controlling opening of said valve has a value of elastic constant measured at -50°C ($K^{-50°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by no more than 40% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

6. A method as claimed in claim 2, wherein said elastic element controlling opening of said valve has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by at least 10% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

7. A method as claimed in claim 2, wherein said elastic element controlling opening of said valve has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by no more than 40% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

8. A method as claimed in claim 3, wherein said elastic element controlling opening of said valve has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +20°C ($K^{+20°C}$) by at least 10% with respect to the value of elastic constant measured at +20°C ($K^{+20°C}$).

9. A method as claimed in claim 3, wherein said elastic

element controlling opening of said valve has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +20°C ($K^{+20°C}$) by no more than 40% with respect to the value of elastic constant measured at +20°C ($K^{+20°C}$).

10. A method as claimed in claim 4, wherein said elastic element controlling opening of said valve has a value of elastic constant measured at -50°C ($K^{-50°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by at least 20% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

11. A method as claimed in claim 5, wherein said elastic element controlling opening of said valve has a value of elastic constant measured at -50°C ($K^{-50°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by no more than 30% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

12. A method as claimed in claim 6, wherein said elastic element controlling opening of said valve has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by at least 20% with respect to the value of elastic constant measured at + 50°C ($K^{+50°C}$).

13. A method as claimed in claim 7, wherein said elastic element controlling opening of said valve has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by no more than 30% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

14. A method as claimed in claim 8, wherein said elastic element controlling opening of said valve has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +20°C ($K^{+20°C}$) by at least 20% with respect to the value of elastic constant measured at + 20°C ($K^{+20°C}$).

15. A method as claimed in claim 9, wherein said elastic element controlling opening of said valve has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +20°C ($K^{+20°C}$) by no more than 30% with respect to the value of elastic constant measured at +20°C ($K^{+20°C}$).

16. A method as claimed in claim 1, wherein the ratio between said operating pressure of the tyre (3) and said first pressure in said tank (4) is included between about 0.1 and about 0.6.

17. A method as claimed in claim 16, wherein the ratio between said operating pressure of the tyre (3) and said first pressure in said tank (4) is included between about 0.2 and about 0.4.

18. A method as claimed in claim 1, wherein said first pressure in said tank (4) is included between about 8 and about 12 bars.

19. A method as claimed in claim 18, wherein said first pressure in said tank (4) is included between about 8.5 and about 10 bars.

20. A method as claimed in claim 1, wherein said step of bringing the inner volume (3') of said tyre (3)

into communication with said tank (4) takes place when the pressure of the inner volume (3') of said tyre (3) is lower than said operating pressure by at least 5%.

21. A method as claimed in claim 1, wherein said elastic constant (K) decreases on increasing of the temperature in said temperature range.

22. A method as claimed in claim 1, wherein said elastic constant (K) increases on decreasing of the temperature in said temperature range.

23. A wheel (1) having a controlled and compensated pressure, comprising:

- a rim (2) associated with a tank (4) adapted to be filled with a fluid to a first pressure;
- a tyre (3) mounted on said rim and having an inner volume (3') inflated to an operating pressure, said operating pressure being lower than said first pressure;
- at least one valve (5) adapted to regulate a communication between said tank (4) and the inner volume (3') of said tyre (3);

said valve (5) comprising at least one elastic element operatively associated with at least one closure member (17) designed to open and close at least one port (9) in said valve (5) to bring said tank (4) into communication with said tyre (3) when pressure in said tyre (3) is lower than said operating pressure, said elastic element having an elastic constant (K) varying within a temperature range from -50°C to +50°C in such a manner that the valve is maintained to a closed position following a reduction in the inner tyre pressure due to a temperature reduction within said range.

24. A wheel as claimed in claim 23, wherein said temperature range is included between about -30°C and about +50°C.

25. A wheel as claimed in claim 23, wherein said temperature range is included between about -30°C and about +20°C.

26. A wheel as claimed in claim 23, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -50°C ($K^{-50°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by at least 10% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

27. A wheel as claimed in claim 23, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -50°C ($K^{-50°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by no more than 40% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

28. A wheel as claimed in claim 24, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by at least 10% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

29. A wheel as claimed in claim 24, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -30°C

($K^{-30°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by no more than 40% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

30. A wheel as claimed in claim 25, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +20°C ($K^{+20°C}$) by at least 10% with respect to the value of elastic constant measured at +20°C ($K^{+20°C}$).

31. A wheel as claimed in claim 25, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +20°C ($K^{+20°C}$) by no more than 40% with respect to the value of elastic constant measured at +20°C ($K^{+20°C}$).

32. A wheel as claimed in claim 26, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -50°C ($K^{-50°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by at least 20% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

33. A wheel as claimed in claim 27, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -50°C ($K^{-50°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by no more than 30% with respect to the value of elastic constant measured at

+50°C ($K^{+50°C}$).

34. A wheel as claimed in claim 28, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by at least 20% with respect to the value of elastic constant measured at + 50°C ($K^{+50°C}$).

35. A wheel as claimed in claim 29, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +50°C ($K^{+50°C}$) by no more than 30% with respect to the value of elastic constant measured at +50°C ($K^{+50°C}$).

36. A wheel as claimed in claim 30, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +20°C ($K^{+20°C}$) by at least 20% with respect to the value of elastic constant measured at + 20°C ($K^{+20°C}$).

37. A wheel as claimed in claim 31, wherein said elastic element controlling opening of said port (9) has a value of elastic constant measured at -30°C ($K^{-30°C}$) differing from the value of elastic constant measured at +20°C ($K^{+20°C}$) by no more than 30% with respect to the value of elastic constant measured at +20°C ($K^{+20°C}$).

38. A wheel as claimed in claim 23, wherein said tank

(4) is integrated into said rim (2).

39. A wheel as claimed in claim 23, wherein said tank (4) involves such a volume that the ratio between said volume of said tank (4) and said inner volume (3') of the tyre is included between about 0.1 and about 0.4.

40. A wheel as claimed in claim 39, wherein said ratio is included between about 0.12 and about 0.25.

41. A wheel as claimed in claim 23, wherein said elastic element is a spring (12).

42. A wheel as claimed in claim 23, wherein said elastic constant (K) decreases on decreasing of the temperature in said temperature range.

43. A wheel as claimed in claim 23, wherein said elastic constant (K) increases on decreasing of the temperature in said temperature range.

44. A wheel as claimed in claim 23, wherein said valve (5) brings said tyre (3) into communication with said tank (4) when pressure in said tyre (3) is lower by at least 5% than said operating pressure

45. A wheel as claimed in claim 23, wherein said wheel (1) comprises an inflation valve (19) operatively associated with said tank (4).

46. A wheel as claimed in claim 23, wherein said wheel (1) comprises a control and restoration valve (20) associated with said tyre (3).

47. A wheel as claimed in claim 41, wherein said

elastic element comprises a second spring (12') operatively associated to said spring (12).

48. A wheel as claimed in claim 47, wherein said second spring (12') has an elastic constant (K) substantially constant within a temperature range from -50°C to +50°C.

49. A wheel as claimed in claim 48, wherein said second spring (12') supports a major portion of the load of said elastic element.

50. A wheel as claimed in claim 49, wherein the load supported by the second spring (12') is comprised between about 60% and about 95% of the load supported by said elastic element.

51. A wheel as claimed in claim 49, wherein the load supported by the second spring (12') is comprised between about 70% and about 80% of the load supported by said elastic element.

52. A wheel as claimed in claim 47, wherein the second spring (12') is concentrically coupled to said spring (12).

53. A wheel as claimed in claim 52, wherein the second spring (12') is external with respect to said spring (12).